



SYLLABUS

KENNESAW STATE UNIVERSITY

ELECTRICAL & COMPUTER ENGINEERING

EE 4490: SPECIAL TOPICS: FIBER OPTIC COMMUNICATIONS - FALL 2025

Course Information

Class meeting time: Tu/Th 9:30am-10:20am

Lecture Modality and Location: *Face to Face; Atrium Building- Room 1222*

Lab Modality and Location: *Face to Face; ETC Q-246*

Syllabus is posted in D2L

Instructor Information

Omar Rawdah, Instructor

E-mail:

Office Phone:

Office Hours: TBA

Office Location:

Preferred method of communication: Email

Course Description

3 Credit Hours- 2 Class Hours 1 Laboratory Hours

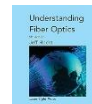
Prerequisites: EE 2401 Semiconductor Devices and EE 3605 Electromagnetics.

Course Materials

Required Text: Understanding Fiber Optics, by Jeff Hecht, 5th edition, SPIE Press Book, 2015.

ISBN: 1511445653

ISBN13: 9781511445658



Recommended Text: Optical WDM Networks, Biswanath Mukherjee, 2nd edition, Springer, 2006.

ISBN: 978-1-4899-7883-7

Some students learning material to be provided from personal notes.

Course Outline

- Fiber optics fundamentals, types, and how they are assembled into cables.
- Optical fibers, their properties (propagation, dispersion, attenuation, non-linearity).
- Laser and LED sources, optical transmitters, detectors, receivers, and amplifiers.
- Fiber optic components: connectors, splicers, couplers, and passive components.
- WDM optics, optical switches, modulators and active components.
- Optical measurement techniques, and test equipment.
- Fiber Optic networks and systems, designing optical systems, and link budgets.
- Applications: Metro and access networks, LANs, Passive Optical Networks, and Free-Space-Optics.

Labs Outline:

- Fiber and Connector Preparation
- Insertion Loss Testing
- Splicing
- OTDR Trace analysis
- Loss Budget Measurements

Learning Outcomes

After successful completion of this course, the students will be able to:

1. Comprehend the fundamentals of optical fibers used for communications.
2. Learn the functionality of the components of a fiber-optic communication system.
3. Describe the properties of optical fiber and performance of a communication link.
4. Recognize and describe Laser and LED sources, optical transmitters, detectors, receivers, optical amplifiers, and repeaters.
5. Identify and describe fiber optic passive and active components, including: connectors, splicers, couplers, splitters, WDM optics.
6. Use optical fiber test equipment and understand optical measurement techniques.
7. Perform simple measurements of fiber, compare multi-mode and single-mode fiber, and splice optical fibers.
8. Measure properties of components used in WDM optical systems
9. Design an optical communication link and analyze its main parameters.
10. Differentiate between fixed optical communications networks (passive and active) and describe the role of fiber in wireless communication networks.
11. Successfully design a fiber-to-the-home network (OSP / ISP).